CLAIMS:

1. A method for detecting a chemical substance in an analyte, comprising steps of:

subjecting an optically anisotropic material at least partially surrounded by absorbent particles to the analyte;

passing light through the anisotropic material;

collecting at least a portion of the passed light; and

detecting a change in an optical anisotropy of the collected light, the change being indicative of the chemical substance in the analyte.

2. The method according to claim 1, comprising positioning the anisotropic material in a flowing course of the analyte.

3. The method according to claim 2, wherein the absorbent particles form a sorbent bed of a respirator cartridge, an air purifying cartridge or a filtration cartridge.

4. The method according to claim 1, comprising disposing the absorbent particles in a housing of a dosimeter.

5. The method according to claim 1, comprising directing light produced by a light source through the anisotropic material.

6. The method according to claim 5, comprising optically coupling the light source to the anisotropic material using a waveguide positioned between the light source and the anisotropic material.

7. The method according to claim 1, comprising optically coupling the anisotropic material to an optical detector.

8. The method according to claim 7, comprising transmitting the collected light through a waveguide between the anisotropic material and the optical detector.

9. The method according to claim 1, wherein the anisotropic material comprises a porous optical material.

10. The method according to claim 9, comprising tuning pore diameter, porosity distribution or pore shape of the porous optical material to alter detection sensitivity or selectivity.

11. The method according to claim 9, wherein the porous optical material comprises porous glass, porous silicon or porous polymer.

12. The method according to claim 9, wherein the porous optical material comprises a porous glass fiber or slab.

13. The method according to claim 12, comprising transilluminating the porous glass fiber or slab with the light.

14. The method according to claim 9, wherein the change in the optical anisotropy is porosity induced.

15. The method according to claim 1, wherein the optical path through the anisotropic material is at least 10^{-7} meters.

16. The method according to claim 1, wherein the optical path through the anisotropic material is less than 10^{-2} meters.

17. The method according to claim 1, comprising analyzing the collected light to determine an optical birefringence of the anisotropic material.

18. The method according to claim 17, comprising detecting a color or phase shift in the collected light.

19. The method according to claim 1, wherein the anisotropic material is between two polarizers.

20. The method according to claim 17, comprising comparing intensities of the collected light at different wavelengths.

21. The method according to claim 17, wherein the anisotropic material comprises an optically birefringent multilayer porous thin film.

22. The method according to claim 17, wherein the anisotropic material comprises an optically birefringent polymer, an optically birefringent polymer composite, or an optically birefringent multilayer polymer film, the optical birefringence of the anisotropic material changing in the presence of the chemical substance due to swelling of the anisotropic material.

23. The method according to claim 1, comprising analyzing the collected light to determine dichroism of the anisotropic material.

24. The method according to claim 23, wherein the anisotropic material comprises an optically dichroic polymer, an optically dichroic polymer composite, or an optically dichroic multilayer polymer film, the dichroism of the anisotropic material changing in the presence of the chemical substance due to swelling of the anisotropic material.

25. The method according to claim 24, comprising measuring intensity changes of a polarization state of the collected light.

26. The method according to claim 24, comprising measuring changes in a ratio of the intensities of two mutually orthogonal polarization states of the collected light.

27. The method according to claim 1, comprising analyzing the collected light to determine a selective absorption thereof by the anisotropic material.

28. The method according to claim 1, comprising analyzing the collected light to determine an optical anisotropic diffusion thereof by the anisotropic material.

29. The method according to claim 28, wherein the collected light exhibits polarization-dependent scattering, and comprising measuring changes in the intensity of a polarization state of the collected light.

30. The method according to claim 28, wherein the collected light exhibits polarization-dependent scattering, and comprising measuring changes in a ratio of the

intensities of two orthogonal polarization states of the collected light.

31. The method according to claim 28, comprising measuring a geometric distribution of the collected light in two mutually orthogonal directions.

32. The method according to claim 1, comprising analyzing the collected light to determine an anisotropic scattering thereof by the anisotropic material.

33. The method according to claim 32, wherein the collected light exhibits polarization-dependent scattering, and comprising measuring changes in the intensity of a polarization state of the collected light.

34. The method according to claim 32, wherein the collected light exhibits polarization-dependent scattering, and comprising measuring changes in a ratio of the intensities of two orthogonal polarization state of the collected light.

35. The method according to claim 32, comprising measuring a geometric distribution of the light collected in two mutually orthogonal directions.

36. The method according to claim 1, wherein there is a hydrophobic agent or treatment on the anisotropic material.

37. The method according to claim 1, wherein there is a surface treatment on the anisotropic material to promote selective detection of the chemical substance or a class of chemical substances by the anisotropic material.

38. The method according to claim 1, comprising selecting a wavelength range of the light prior to passing the light through the anisotropic material.

39. The method according to claim 38, wherein there is a filter in an optical path followed by the passed light.

40. The method according to claim 1, comprising filtering the collected light to enhance signal contrast or cut unwanted wavelengths.

41. The method according to claim 40, wherein there is a filter in an optical path followed by the collected light.

42. The method according to claim 1, comprising polarizing the light prior to passing the light through the anisotropic material.

43. The method according to claim 42, comprising linearly polarizing the light.

44. The method according to claim 43, wherein the anisotropic material comprises a birefringent material, an optical axis of which is placed in a propagation plane of the light at an angle with respect to a direction of the linear polarization.

45. The method according to claim 44, wherein the angle is substantially 45°.

46. The method according to claim 44, wherein there is a linear analyzer in an optical path followed by the collected light.

47. The method according to claim 46, comprising crossing the linear analyzer with respect to the linear polarization, thereby transmitting light that has been rotated by the birefringent material.

48. The method according to claim 46, comprising generally aligning the linear analyzer optical axis in parallel with respect to the linear polarization.

49. The method according to claim 42, comprising reflecting the passed light back through the anisotropic material prior to collecting the passed light.

50. The method according to claim 49, comprising reflecting the passed light on a reflective interface adjacent a side of the anisotropic material.

51. The method according to claim 50, wherein the reflective interface comprises a reflective material contacting the anisotropic material.

52. The method according to claim 50, wherein the light passes through a linear polarizer and is subjected to linear polarization before passing through the anisotropic material, and wherein the collected light passes through a linear analyzer.

53. The method according to claim 52, wherein the linear polarizer and the linear analyzer are integral with the anisotropic material.

54. The method according to claim 49, comprising producing multiple reflections of the passed light through the anisotropic material.

55. The method according to claim 54, wherein facing reflective interfaces on generally opposing sides of the anisotropic material produce the multiple reflections.

56. The method according to claim 52, wherein the light passes through a retardation plate between the linear polarizer and the anisotropic material and between the anisotropic material and the linear analyzer.

57. The method according to claim 42, comprising:

partially reflecting the passed light to produce reflected and transmitted passed light beams, collecting the reflected and transmitted light beams using a parallel or perpendicular analyzer in an optical path followed by the reflected light beam and a perpendicular or parallel analyzer in an optical path followed by the transmitted light beam; and

measuring intensities of the reflected and transmitted light beams, respectively, and analyzing a ratio thereof.

58. The method according to claim 57, comprising passing the reflected light beam through the anisotropic material prior to collecting the reflected light beam.

59. A sensor for detecting a chemical substance in an analyte, comprising:

an optically anisotropic material at least partially surrounded by absorbent particles to be subjected to the analyte;

a light supply passing light through the anisotropic material;

a collector capturing at least a portion of the passed light; and

a detector characterizing or quantifying a change in an optical anisotropy of the collected light, the change being indicative of the chemical substance in the analyte.

60. The sensor according to claim 59, wherein the light supply comprises a waveguide optically coupled to the anisotropic material.

61. The sensor according to claim 59, wherein the collector comprises a waveguide optically coupled to the anisotropic material.

62. The sensor according to claim 59, wherein the light supply and the collector comprise a common optical arrangement including a reflective interface adjacent a first side of the anisotropic material, and an optical fiber optically coupled to the anisotropic material on a second side thereof opposite the first side.

63. The sensor according to claim 59, wherein:

the light supply comprises a polarizer; and

the collector comprises an analyzer.

64. The sensor according to claim 59, comprising a perforated or permeable tube having first and second end windows, the anisotropic material being positioned in the tube, the first end window being provided with a polarizer, the second end window being provided with an analyzer.

65. The sensor according to claim 64, wherein the perforated or permeable tube is inside a filter cartridge for respiratory or filtration devices.

66. The sensor according to claim 59, wherein the light supply comprises a window and a polarizer adjacent the window, the anisotropic material being viewable through the window, the sensor having at least one reflective interface that reflects light through the anisotropic material towards the window.

67. The sensor according to claim 66, wherein the anisotropic material is divided into sensing elements positioned at different depths in a bed of the absorbent particles to show progression of the chemical substance through the bed.

68. The sensor according to claim 67, wherein the bed is inside a filter cartridge for respiratory or filtration devices, the sensor providing the filter cartridge with remaining-life indicating capability.

69. The sensor according to claim 59, wherein the absorbent particles are contained in a housing of a dosimeter.

70. The sensor according to claim 59, comprising a permeable tube or membrane containing the anisotropic material.

71. The sensor according to claim 59, wherein the anisotropic material has a treated surface promoting selective detection of the chemical substance or a class of chemical substances.

72. The sensor according to claim 59, wherein the anisotropic material is embedded in the absorbent particles.

73. The sensor according to claim 59, wherein the absorbent particles are contained in a housing having an inlet and an outlet defining a flowing course of the analyte, the anisotropic material being positioned in the flowing course of the analyte.

74. The sensor according to claim 59, wherein the light supply comprises a light source producing light passing through the anisotropic material.

75. The sensor according to claim 74, wherein the light supply comprises a waveguide optically coupling the light source to the anisotropic material.

76. The sensor according to claim 74, wherein the anisotropic material comprises a porous optical material.

77. The sensor according to claim 76, wherein alteration in the pore diameter, porosity distribution or pore shape of the anisotropic material will alter the detection sensitivity or selectivity of the sensor.

78. The sensor according to claim 76, wherein the porous optical material comprises porous glass, porous silicon or porous polymer.

79. The sensor according to claim 76, wherein the porous optical material comprises a porous glass fiber or slab.

80. The sensor according to claim 59, wherein the optical path through the anisotropic material is at least 10^{-7} meters.

81. The sensor according to claim 59, wherein the optical path through the anisotropic material is less than 10^{-2} meters.

82. The sensor according to claim 59, wherein the anisotropic material comprises an optically birefringent multilayer porous thin film.

83. The sensor according to claim 59, wherein the anisotropic material comprises an optically birefringent polymer, an optically birefringent polymer composite, or an optically birefringent multilayer polymer film, an optical birefringence of the anisotropic material changing in the presence of the chemical substance due to swelling of the anisotropic material.

84. The sensor according to claim 59, wherein the anisotropic material comprises an optically dichroic polymer, an optically dichroic polymer composite, or an optically dichroic multilayer polymer film, a dichroism of the

anisotropic material changing in the presence of the chemical substance due to swelling of the anisotropic material.

85. The sensor according to claim 59, wherein there is a hydrophobic agent or treatment on the anisotropic material.

86. The sensor according to claim 59, wherein there is a surface treatment on the anisotropic material to promote selective detection of the chemical substance or a class of chemical substances by the anisotropic material.

87. The sensor according to claim 59, wherein the light supply comprises a filter in an optical path followed by the light.

88. The sensor according to claim 59, wherein the collector comprises a filter in an optical path followed by the collected light.

89. The sensor according to claim 59, comprising a reflective interface adjacent the anisotropic material reflecting the passed light back through the anisotropic material to the collector.

90. The sensor according to claim 59, comprising reflective interfaces adjacent generally opposing sides of the anisotropic material which produce multiple reflections of the passed light.

91. The sensor according to claim 63, further comprising a retardation plate between the polarizer and anisotropic material and between the anisotropic material and analyzer.

92. The sensor according to claim 59, comprising:

a partially reflective interface adjacent the anisotropic material to produce reflected and transmitted passed light beams, the collector capturing the reflected and transmitted light beams using a parallel or perpendicular analyzer in an optical path followed by the reflected light beam and a perpendicular or parallel analyzer in an optical path followed by the transmitted light beam.

93. The sensor according to claim 92, wherein the reflected light beam passes through the anisotropic material prior to capture.

94. The sensor according to claim 59, wherein the detector comprises the human eye.

95. The sensor according to claim 59, wherein the detector comprises a photoelectronic device.

96. The sensor according to claim 59, wherein the detector comprises a spectrophotometer.

97. The sensor according to claim 59, wherein the detector comprises a photodiode.

98. The sensor according to claim 74, wherein the light source comprises ambient light.

99. The sensor according to claim 74, wherein the light source comprises a light emitting diode.

100. The sensor according to claim 99, wherein the light emitting diode provides at least two colors.

101. A method for detecting a chemical substance in an analyte, comprising steps of:

subjecting an optically anisotropic material to the analyte;

passing visible light through the anisotropic material;

collecting at least a portion of the passed visible light; and

detecting a change in a polarization state of the collected visible light, the change being indicative of the chemical substance in the analyte.

102. The method according to claim 101, comprising positioning the anisotropic material in a flowing course of the analyte.

103. The method according to claim 102, wherein the optically anisotropic material is embedded in a sorbent bed of a respirator cartridge, an air purifying cartridge or a filtration cartridge.

104. The method according to claim 101, comprising at least partially surrounding the optically anisotropic material with absorbent particles disposed in a housing of a dosimeter.

105. The method according to claim 101, comprising directing light produced by a light source through the anisotropic material.

106. The method according to claim 105, comprising optically coupling the light source to the anisotropic

material using a waveguide positioned between the light source and the anisotropic material.

107. The method according to claim 101, comprising optically coupling the anisotropic material to an optical detector.

108. The method according to claim 107, comprising transmitting the collected light through a waveguide between the anisotropic material and the optical detector.

109. The method according to claim 101, wherein the anisotropic material comprises a porous optical material.

110. The method according to claim 109, comprising tuning pore diameter, porosity distribution or pore shape of the porous optical material to alter detection sensitivity or selectivity.

111. The method according to claim 109, wherein the porous optical material comprises porous glass, porous silicon or porous polymer.

112. The method according to claim 109, wherein the porous optical material comprises a porous glass fiber or slab.

113. The method according to claim 112, comprising transilluminating the porous glass fiber or slab with the light.

114. The method according to claim 109, wherein the change in the polarization state is porosity induced.

115. The method according to claim 101, wherein the optical path through the anisotropic material is at least 10^{-7} meters.

116. The method according to claim 101, wherein the optical path through the anisotropic material is less than 10^{-2} meters.

117. The method according to claim 101, comprising analyzing the collected light to determine an optical birefringence of the anisotropic material.

118. The method according to claim 117, comprising detecting a color or phase shift in the collected light.

119. The method according to claim 101, wherein the anisotropic material is between two polarizers.

120. The method according to claim 117, comprising comparing intensities of the collected light at different wavelengths.

121. The method according to claim 117, wherein the anisotropic material comprises an optically birefringent multilayer porous thin film.

122. The method according to claim 117, wherein the anisotropic material comprises an optically birefringent polymer, an optically birefringent polymer composite, or an optically birefringent multilayer polymer film, the optical birefringence of the anisotropic material changing in the

presence of the chemical substance due to swelling of the anisotropic material.

123. The method according to claim 101, comprising analyzing the collected light to determine a dichroism of the anisotropic material.

124. The method according to claim 123, wherein the anisotropic material comprises an optically dichroic polymer, an optically dichroic polymer composite, or an optically dichroic multilayer polymer film, the dichroism of the anisotropic material changing in the presence of the chemical substance due to swelling of the anisotropic material.

125. The method according to claim 124, comprising measuring intensity changes of the polarization state of the collected light.

126. The method according to claim 124, comprising measuring changes in a ratio of the intensities of two mutually orthogonal polarization states of the collected light.

127. The method according to claim 101, comprising analyzing the collected light to determine a selective absorption thereof by the anisotropic material.

128. The method according to claim 101, comprising analyzing the collected light to determine an optical anisotropic diffusion thereof by the anisotropic material.

129. The method according to claim 128, wherein the collected light exhibits polarization-dependent scattering,

and comprising measuring changes in the intensity of the polarization state of the collected light.

130. The method according to claim 128, wherein the collected light exhibits polarization-dependent scattering, and comprising measuring changes in a ratio of the intensities of two orthogonal polarization states of the collected light.

131. The method according to claim 128, comprising measuring a geometric distribution of the collected light in two mutually orthogonal directions.

132. The method according to claim 101, comprising analyzing the collected light for determining an anisotropic scattering thereof by the anisotropic material.

133. The method according to claim 132, wherein the collected light exhibits polarization-dependent scattering, and comprising measuring changes in the intensity of a polarization state of the collected light.

134. The method according to claim 132, wherein the collected light exhibits polarization-dependent scattering, and comprising measuring changes in a ratio of the intensities of two orthogonal polarization state of the collected light.

135. The method according to claim 132, comprising measuring a geometric distribution of the light collected in two mutually orthogonal directions.

136. The method according to claim 101, wherein there is a hydrophobic agent or treatment on the anisotropic material.

137. The method according to claim 101, wherein there is a surface treatment on the anisotropic material to promote selective detection of the chemical substance or a class of chemical substances thereof by the anisotropic material.

138. The method according to claim 101, further comprising selecting a wavelength range of the light prior to passing the light through the anisotropic material.

139. The method according to claim 138, wherein there is a filter in an optical path followed by the passed light.

140. The method according to claim 101, comprising filtering the collected light to enhance signal contrast or cut unwanted wavelengths.

141. The method according to claim 140, wherein there is a filter in an optical path followed by the collected light.

142. The method according to claim 101, comprising polarizing the light prior to passing the light through the anisotropic material.

143. The method according to claim 142, comprising linearly polarizing the light.

144. The method according to claim 143, wherein the anisotropic material comprises a birefringent material, an optical axis of which is placed in a propagation plane of the

light at an angle with respect to a direction of the linear polarization.

145. The method according to claim 144, wherein the angle is substantially 45°.

146. The method according to claim 144, wherein there is a linear analyzer in an optical path followed by the collected light.

147. The method according to claim 146, comprising crossing the linear analyzer with respect to the linear polarization, thereby transmitting light that has been rotated by the birefringent material.

148. The method according to claim 146, comprising generally aligning the linear analyzer optical axis in parallel with respect to the linear polarization.

149. The method according to claim 142, comprising reflecting the passed light back through the anisotropic material prior to collecting the passed light.

150. The method according to claim 149, comprising reflecting the passed light on a reflective interface adjacent a side of the anisotropic material.

151. The method according to claim 150, wherein the reflective interface comprises a reflective material contacting the anisotropic material.

152. The method according to claim 150, wherein the light passes through a linear polarizer and is subjected to

linear polarization before passing through the anisotropic material, and wherein the collected light passes through a linear analyzer.

153. The method according to claim 152, wherein the linear polarizer and the linear analyzer are integral with the anisotropic material.

154. The method according to claim 149, comprising producing multiple reflections of the passed light through the anisotropic material.

155. The method according to claim 154, wherein facing reflective interfaces on generally opposing sides of the anisotropic material produce the multiple reflections.

156. The method according to claim 152, wherein the light passes through a retardation plate between the linear polarizer and the anisotropic material and between the anisotropic material and the linear analyzer.

157. The method according to claim 142, comprising:

partially reflecting the passed light to produce reflected and transmitted passed light beams, collecting the reflected and transmitted light beams, using a parallel or perpendicular analyzer in an optical path followed by the reflected light beam, and a perpendicular or parallel analyzer in an optical path followed by the transmitted light beam; and

measuring intensities of the reflected and transmitted light beams, respectively, and analyzing a ratio thereof.

158. The method according to claim 157, comprising passing the reflected light beam through the anisotropic material prior to collecting the reflected light beam.

159. A sensor for detecting a chemical substance in an analyte, comprising:

an optically anisotropic material to be subjected to the analyte;

a light supply passing visible light through the anisotropic material;

a collector capturing at least a portion of the passed visible light; and

a detector characterizing or quantifying a change in a polarization state of the collected visible light, the change being indicative of the chemical substance in the analyte.

160. The sensor according to claim 159, wherein the light supply comprises a waveguide optically coupled to the anisotropic material.

161. The sensor according to claim 159, wherein the collector comprises a waveguide optically coupled to the anisotropic material.

162. The sensor according to claim 159, wherein the light supply and the collector comprise a common optical arrangement including a reflective interface adjacent a first side of the anisotropic material, and an optical fiber optically coupled to the anisotropic material on a second side thereof opposite the first side.

163. The sensor according to claim 159, wherein:

the light supply comprises a polarizer; and

the collector comprises an analyzer.

164. The sensor according to claim 159, comprising a perforated or permeable tube having first and second end windows, the anisotropic material being positioned in the tube, the first end window being provided with a polarizer, the second end window being provided with an analyzer.

165. The sensor according to claim 164, wherein the perforated or permeable tube is inside a filter cartridge for respiratory or filtration devices.

166. The sensor according to claim 159, wherein the light supply comprises a window and a polarizer adjacent the window, the anisotropic material being viewable through the window, the sensor having at least one reflective interface that reflects light through the anisotropic material towards the window.

167. The sensor according to claim 166, wherein the anisotropic material is divided into sensing elements positioned at different depths in a bed of absorbent particles to show progression of the chemical substance through the bed.

168. The sensor according to claim 167, wherein the bed is inside a filter cartridge for respiratory or filtration devices, the sensor providing the filter cartridge with remaining-life indicating capability.

169. The sensor according to claim 159, wherein the optically anisotropic material is at least partially

surrounded by absorbent particles contained in a housing of a dosimeter.

170. The sensor according to claim 159, comprising a permeable tube or membrane containing the anisotropic material.

171. The sensor according to claim 159, wherein the anisotropic material has a treated surface promoting selective detection of the chemical substance or a class of chemical substances.

172. The sensor according to claim 159, wherein the anisotropic material is embedded in the absorbent particles.

173. The sensor according to claim 159, wherein the optically anisotropic material is at least partially surrounded by absorbent particles contained in a housing having an inlet and an outlet defining a flowing course of the analyte, the anisotropic material being positioned in the flowing course of the analyte.

174. The sensor according to claim 159, wherein the light supply comprises a light source producing light passing through the anisotropic material.

175. The sensor according to claim 174, wherein the light supply comprises a waveguide optically coupling the light source to the anisotropic material.

176. The sensor according to claim 174, wherein the anisotropic material comprises a porous optical material.

177. The sensor according to claim 176, wherein alteration in the pore diameters, porosity distribution or pore shape of the anisotropic material will alter the detection sensitivity or selectivity of the sensor.

178. The sensor according to claim 176, wherein the porous optical material comprises porous glass, porous silicon or porous polymer.

179. The sensor according to claim 176, wherein the porous optical material comprises a porous glass fiber or slab.

180. The sensor according to claim 159, wherein the optical path through the anisotropic material is at least 10^{-7} meters.

181. The sensor according to claim 159, wherein the optical path through the anisotropic material is less than 10^{-2} meters.

182. The sensor according to claim 159, wherein the anisotropic material comprises an optically birefringent multilayer porous thin film.

183. The sensor according to claim 159, wherein the anisotropic material comprises an optically birefringent polymer, an optically birefringent polymer composite, or an optically birefringent multilayer polymer film, an optical birefringence of the anisotropic material changing in the presence of the chemical substance due to swelling of the anisotropic material.

184. The sensor according to claim 159, wherein the anisotropic material comprises an optically dichroic polymer, an optically dichroic polymer composite, or an optically dichroic multilayer polymer film, a dichroism of the anisotropic material changing in the presence of the chemical substance due to swelling of the anisotropic material.

185. The sensor according to claim 159, wherein there is a hydrophobic agent or treatment on the anisotropic material.

186. The sensor according to claim 159, wherein there is a surface treatment on the anisotropic material to promote selective detection of the chemical substance or a class of chemical substances by the anisotropic material.

187. The sensor according to claim 159, wherein the light supply comprises a filter in an optical path followed by the light.

188. The sensor according to claim 159, wherein the collector comprises a filter in an optical path followed by the collected light.

189. The sensor according to claim 159, comprising a reflective interface adjacent the anisotropic material reflecting the passed light back through the anisotropic material to the collector.

190. The sensor according to claim 159, comprising reflective interfaces adjacent generally opposing sides of the anisotropic material which produce multiple reflections of the passed light.

191. The sensor according to claim 163, further comprising a retardation plate between the polarizer and anisotropic material and between the anisotropic material and analyzer.

192. The sensor according to claim 159, comprising:

a partially reflective interface adjacent the anisotropic material to produce reflected and transmitted passed light beams, the collector capturing the reflected and transmitted light beams using a parallel or perpendicular analyzer in an optical path followed by the reflected light beam and a perpendicular or parallel analyzer in an optical path followed by the transmitted light beam.

193. The sensor according to claim 192, wherein the reflected light beam passes through the anisotropic material prior to capture.

194. The sensor according to claim 159, wherein the detector comprises the human eye.

195. The sensor according to claim 159, wherein the detector comprises a photoelectronic device.

196. The sensor according to claim 159, wherein the detector comprises a spectrophotometer.

197. The sensor according to claim 159, wherein the detector comprises a photodiode.

198. The sensor according to claim 174, wherein the light source comprises ambient light.

199. The sensor according to claim 174, wherein the light source comprises a light emitting diode.

200. The sensor according to claim 199, wherein the light emitting diode provides at least two colors.

201. A method for detecting a chemical substance in an analyte, comprising steps of:

subjecting an optically anisotropic material other than porous silicon to the analyte;

passing light through the anisotropic material;

collecting at least a portion of the passed light; and

detecting a change in an optical anisotropy of the collected light, the change being indicative of the chemical substance in the analyte.

202. A sensor for detecting a chemical substance in an analyte, comprising:

an optically anisotropic material other than porous silicon to be subjected to the analyte;

a light supply passing light through the anisotropic material;

a collector capturing at least a portion of the passed light; and

a detector characterizing or quantifying a change in an optical anisotropy of the collected light, the change being indicative of the chemical substance in the analyte.